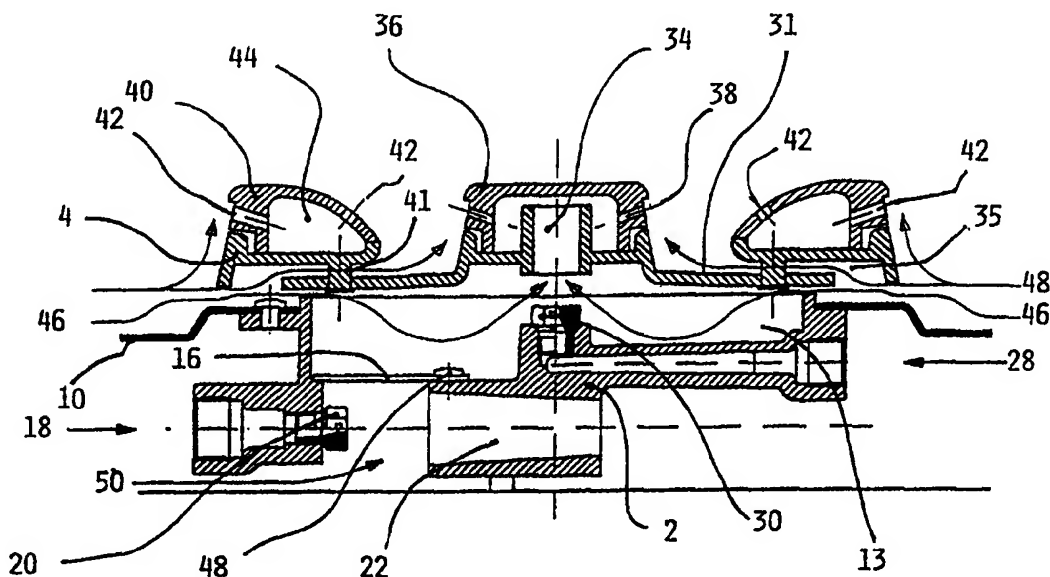




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/EP98/04753 (22) International Filing Date: 28 July 1998 (28.07.98) (30) Priority Data: VE97A000034 11 August 1997 (11.08.97) IT (71) Applicant (for all designated States except US): OFFICINE MECCANICHE DEFENDI S.R.L. [IT/IT]; Via Direttissima del Conero, 73, I-60021 Camerano (IT). (72) Inventor; and (75) Inventor/Applicant (for US only): PAESANI, Carlo [IT/IT]; Via Direttissima del Conero, 73, I-60021 Camerano (IT). (74) Agent: PIOVESANA, Paolo; Corso del Popolo, 70, I-30172 Venezia Mestre (IT).		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HR, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  Published With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

(54) Title: GAS BURNER WITH SEVERAL FLAME SECTORS



## (57) Abstract

A gas burner with several flame sectors for a cooker, comprising at least two concentric flame sectors (36, 40), each fed separately by a corresponding nozzle (30, 20), characterised in that: said nozzles are mutually separate, the outer sector (40) is fed with a mixture formed from gas leaving one (20) of said nozzles and primary air (50) originating from the cooker interior, the inner sector (36) is fed with a mixture formed from gas leaving the other nozzle (30) and primary air (46) originating from the cooker exterior, said gas/primary air mixture of the two sectors being mixed with secondary air (48) originating from the cooker exterior.

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## GAS BURNER WITH SEVERAL FLAME SECTORS

This invention relates to a gas burner with several flame sectors.

Gas burner for food cooking are known. In addition to traditional burners comprising one flame ring, so-called "double ring" or "triple ring" burners and double burners are also available. These latter comprise two  
5 flame rings controllable separately by one or two gas feed taps.

This type of burner which, because of the requirement for greater power to achieve quicker cooking and greater efficiency, has an outer flame diameter greater than traditional burners, has however certain joint or  
10 separate drawbacks, and in particular:

- a very low maximum power in the light of the actual burner dimensions, while at the same time having a too high minimum power,
- a certain complexity in changing the nozzle when passing from one type of gas to another,
- 15 - "streaming" problems, ie burner extinguishing arising from air movement due to the suction caused by opening the door of the oven or of the furniture item lying below the cooker.

An object of the invention is to obviate these drawbacks by providing a multi flame-ring gas burner having the advantages of known cup burners,  
20 while at the same time eliminating their drawbacks.

This and further objects which will be apparent from the ensuing description are attained according to the invention by a gas burner with several flame sectors for a cooker as described in claim 1.

A preferred embodiment of this invention is described in detail  
25 hereinafter with reference to the accompanying drawings, on which:

Figure 1 is a plan view of the burner cup,

Figure 2 is an axial section through the burner on the line II-II of Figure 1, and Figure 3 is an axial section therethrough on the line III-III of Figure 1.

As can be seen from the figures, the gas burner of the invention comprises substantially a cup 2 and a body 4 external to the hob surface.

5       The cup 2 comprises a collar 6 provided with appendices 8 for the support and fixing of the sheet metal 10 which forms the cooker or hob. The cup 2 is divided by a horizontal baffle 12 defining a chamber 13 which is lowerly provided with an aperture 14 closed by a removable cover 16.

10       The lower part of the cup 2 below the baffle 12 houses a gas feed conduit 18 provided with a nozzle 20 positioned horizontally and hence parallel to the sheet metal 10.

15       Facing the nozzle 20 there is provided a primary air-gas mixing device consisting of a Venturi tube 22 divided downstream into two conduits 24 which then bend through 90° in a vertical direction to form two columns 26 positioned diametrically about the cup axis.

      The chamber 13 of the cup 2 houses a second gas feed conduit 28 provided with a nozzle 30 of vertical axis.

20       The body 4 which rests on the cup 2 is connected to a discoidal element 31 provided centrally with a Venturi tube 34 facing the top of the nozzle 30 and supporting a substantially cylindrical flame divider 36 with lateral holes 38. The body 4 is provided with pegs 41 inserted into the discoidal element 31 to form passage channels 35 for secondary air.

25       A flame divider 40 rests on the body 4 to define an annular chamber 44 provided with holes 42. Two vertical conduits 32 cooperating with the cup columns 26 terminate in said chamber 44.

The gas burner of the invention operates in the following manner, reference being made to a single gas tap with two exit paths, it being however apparent that the burner can also be fed via two gas taps, one for each flame sector to be formed.

5           It is also apparent that in the illustrated example the gas flow through the conduit 18 is greater than the gas flow through the conduit 28.

When the gas tap is in its maximum open position corresponding to maximum gas burner power, the gas enters through the conduits 18 and 28, and in particular:

- 10       - the gas which enters through the conduit 18 and leaves from the nozzle 20 enters the Venturi tube 22 to draw in a large quantity of primary air 50 from below the metal sheeting, to consequently achieve good mixing and hence high power with good combustion. The primary air-gas mixture advances along the conduits 24 and columns 26, to enter the annular chamber 40 via
- 15       the conduits 32. From this chamber the primary air-gas mixture emerges through the holes 42 to burn using secondary air originating from above the cooker for its combustion,
- 20       - the gas which enters through the conduit 28 and leaves from the nozzle 30 enters the Venturi tube 34 to draw in primary air 46 from the top of the metal sheeting 10. The primary air-gas mixture hence reaches the holes 38, from which it emerges to burn using the secondary air 48 originating from above the metal sheeting 10 and passing through the channels 35.

On operating the gas tap to adjust the gas flow from maximum to minimum value, the gas quantity entering via the conduits 18 and 28

25       progressively decreases to hence reduce the flame power and dimensions.

This operation is at no stage affected by the streaming effect due to the opening or closure of a furniture or oven door located below the hob, which could cause air movement such as to interrupt the normal flow of primary air to the Venturi tube 22 and consequently cause the flames to  
5 separate from the holes 40 of the flame divider to the extent of extinguishing them.

In this respect the flame divider 36 at all stages remains fed because the primary air-gas mixture which feeds it is formed by the primary air 46 originating from above the metal sheeting 10, with the result that the flames  
10 leaving the holes 38 immediately re-ignite the mixture leaving the holes 42.

The effect of adjusting the burner to minimum flow has the effect of interrupting gas feed through the conduit 18, with consequent extinguishing of the flames leaving the holes 42.

As the flame divider 36 is of small dimensions it enables a very low  
15 minimum flow to be maintained as the small gas quantity is distributed over a very small diameter.

To again return the burner from minimum to maximum flow configuration, the gas tap is again turned to allow the gas to enter through the conduit 18, with formation of a mixture which, as stated, emerges from the  
20 holes 42 and ignites by contact with the flames leaving the holes 38.

From the aforesaid it is apparent that the gas burner of the invention offers numerous advantages, and in particulars:

- it can deliver a very high power by virtue of the horizontal arrangement of the Venturi tube 22, which can be dimensioned to allow mixing of a  
25 considerable quantity of primary air and gas,

- the nozzle 20 can be easily and quickly changed because of the access offered to the chamber 13 by the removability of cover 16, which is fixed to the wall 12 by a screw 48,
  - it is substantially insensitive to the streaming effect as one of the injectors
- 5 is fed with primary air originating from above the hob.

## C L A I M S

1. A gas burner with several flame sectors for a cooker, comprising at least two concentric flame sectors (36,40), each fed separately by a corresponding nozzle (30,20), characterised in that:
  - 5 - said nozzles are mutually separate,
  - the outer sector (40) is fed with a mixture formed from gas leaving one (20) of said nozzles and primary air (50) originating from the cooker interior,
  - the inner sector (36) is fed with a mixture formed from gas leaving the other nozzle (30) and primary air (46) originating from the cooker exterior,
  - 10 - said gas/primary air mixture of the two sectors being mixed with secondary air (48) originating from the cooker exterior.
2. A burner as claimed in claim 1, characterised by consisting of a cup (2) housing the two nozzles (20,30), and a body (4) supporting the two flame sectors (36,40).
- 15 3. A burner as claimed in claim 2, characterised in that the body (4) supports the outer sector (40) and is connected to a discoidal element (31) centrally supporting one flame sector (36).
4. A burner as claimed in claim 3, characterised in that the body (4) is provided with pegs (41) for insertion into the discoidal element (31), and with  
20 this latter forms passage channels (35) for the secondary air (48).
5. A burner as claimed in claim 1, characterised in that said sectors consists of rings.
6. A burner as claimed in claim 1, characterised in that a horizontally arranged Venturi tube (22) faces the nozzle (20) feeding the outer ring.



7. A burner as claimed in claim 6, characterised in that the Venturi tube (22) branches into two conduits (24) which then diverge upwards to connect to the body (4).

8. A burner as claimed in claim 2, characterised in that the cup (2) comprises a horizontal baffle (12) defining a chamber (13) which houses the nozzle (30).

9. A burner as claimed in claim 1, characterised in that the chamber (13') housing the nozzle (30) which feeds the central flame sector (36) is closed lowerly.

10. A burner as claimed in claim 9, characterised in that the chamber (13') is provided lowerly with an aperture (14) facing the feed nozzle (20) for the outer flame sector, said aperture being provided with a removable closure cover (16).

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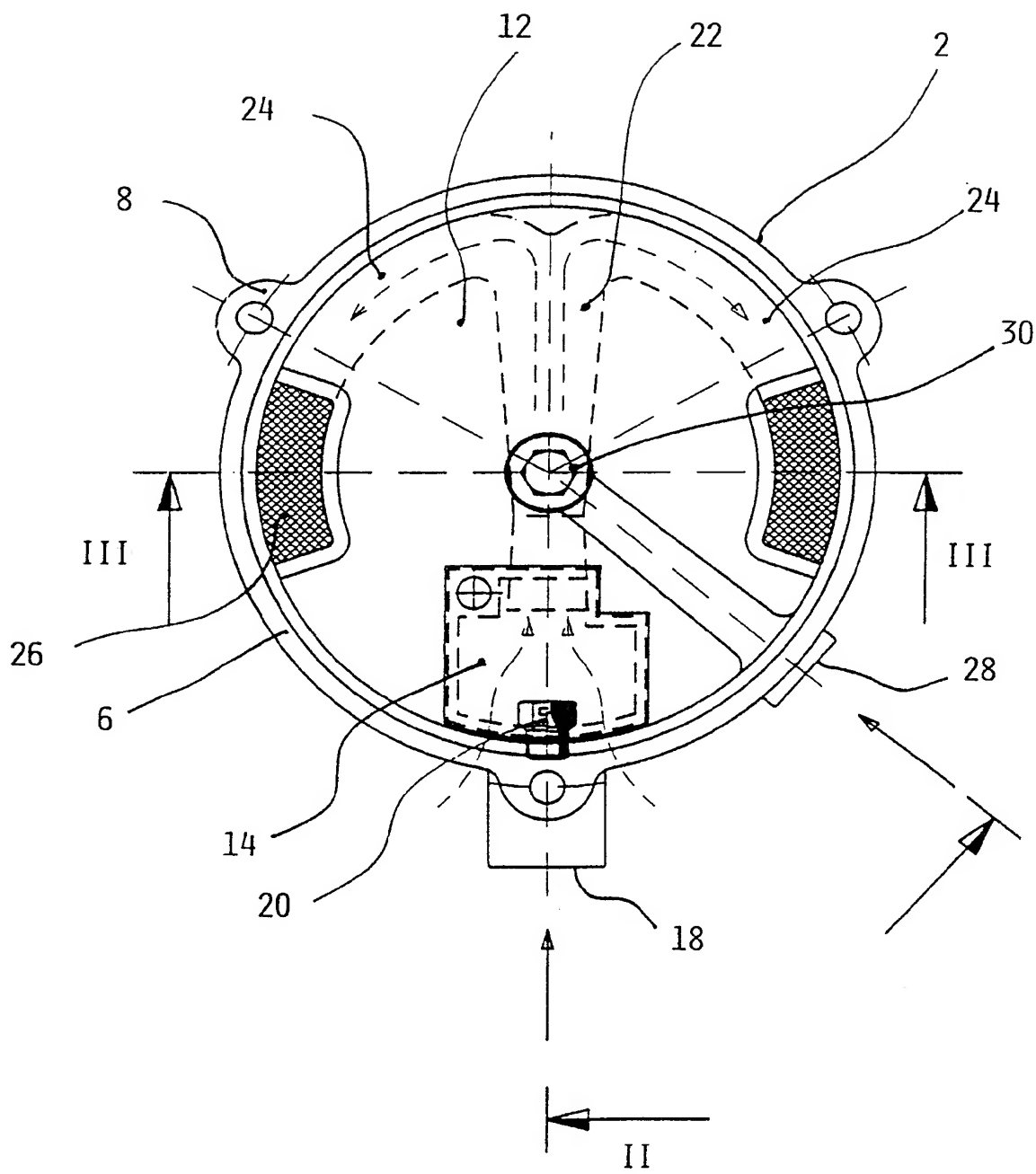


FIG. 1

FIG. 2

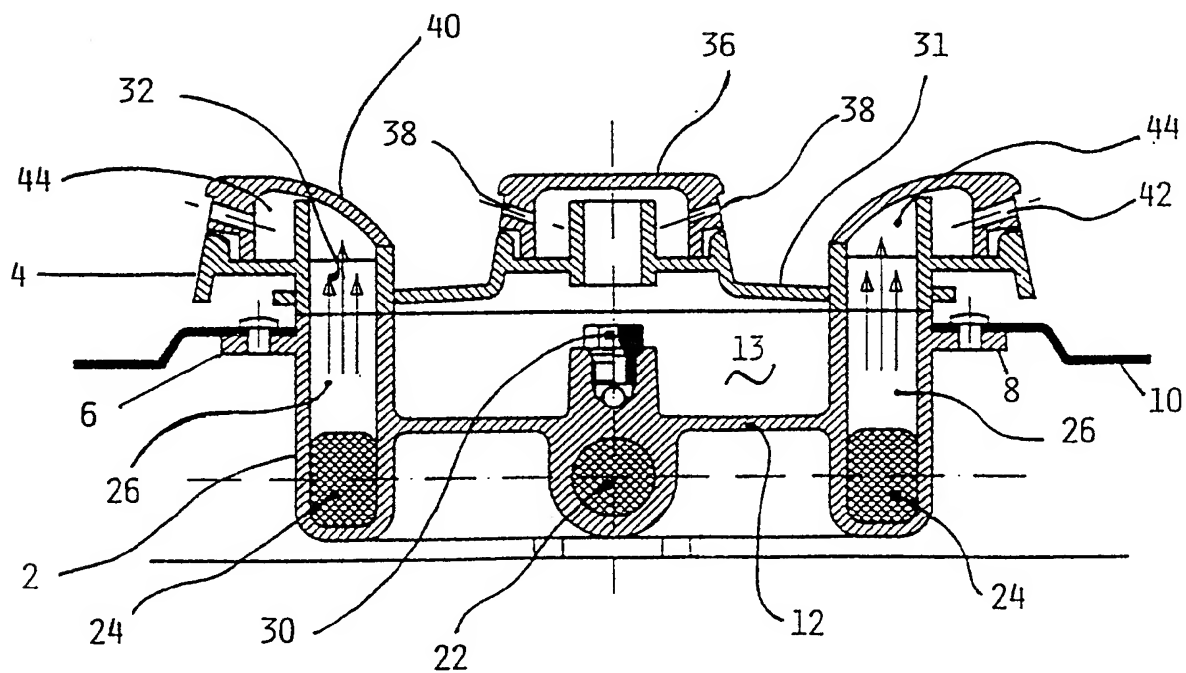
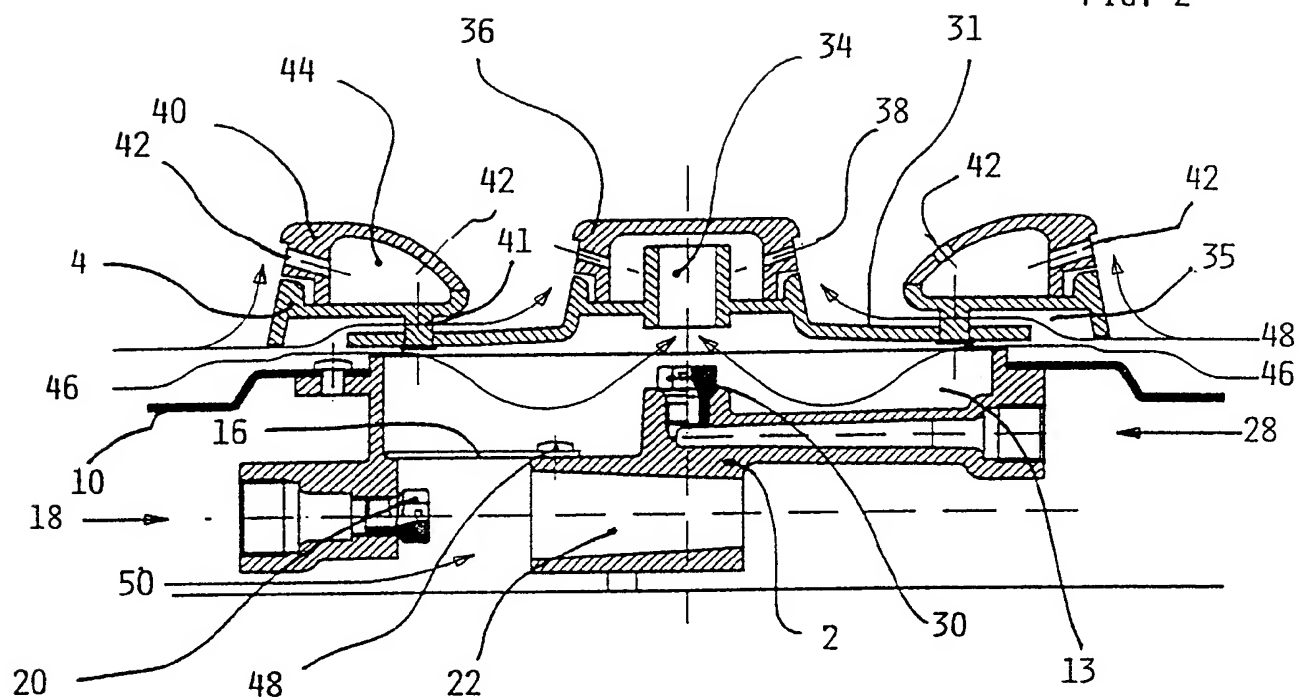


FIG. 3

# INTERNATIONAL SEARCH REPORT

Inter. Appl. No.

PCT/EP 98/04753

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 6 F23D14/06

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 F23D F24C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	FR 2 650 369 A (MERLONI ELETTRODOMESTICI SPA) 1 February 1991 see abstract see page 2, line 19 - page 2, line 28 see page 3, line 23 - page 5, line 7 see figures 1,2 ---	1,2,5,9
A	EP 0 525 299 A (ISPHORDING METALLWERKE PAUL) 3 February 1993 see column 1, line 17 - column 1, line 38 see column 2, line 1 - column 3, line 15 see figures 1-3 ---	1
A	EP 0 485 645 A (MIRALFIN SRL) 20 May 1992 see column 3, line 1 - column 3, line 33; figures 1-3 --- -/--	1



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